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Implement & Tractor

The Business Magazine of the Farm and Industrial Equipment Industry

in this issue...

16: Toronto Again: Same Words, New Tune. Previewing next month's conventions of three farm equipment associations, FEWA, FEMA and AIMRA. Though energy, inflation, and other concerns remain from the groups' 1973 get-togethers in Toronto, the temper in which these problems are discussed (as with the temper of the times) should be much calmer this year.

26: Salesmen's Expenses, Productivity, Product Training and the Manufacturer as Product Innovator. With selling expenses way up for most distributors, indications are that many of them are working a little bit harder than they did to keep profits up too. Reporting on an I&T survey of farm equipment wholesalers and manufacturers reps.

38: Farmers Talk Tractor Reliability, Maintenance. As usual, every tractor model rated by farmers in the recent Professional Farmers of America big-tractor survey received a wide variety of positive and negative marks, but the general feeling seems to be that big tractors have sizable problems with reliability and ease of maintenance.

54: Energy-Conscious Royal Show. Machines that save on fuel attracted plenty of attention at the big summer machinery show in Britain, where diesel fuel costs around $2.00 a gallon.

64: New Tractors: A Quickie Roundup. The latest models from Case, Long, Steiger, Kubota, Versatile, Belarus and Deere.

DEPARTMENTS

What's Ahead	4	New Literature	63
Retail Sales of Wheel Tractors	10	Auction Prices	68
What's New	33	News Briefs	72
Retail Sales of Selected Farm Equipment	48	Farm Equipment Patents	75
Industry in Motion	62	Classified Ads	75
		Index to Advertisers	78

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what's ahead...

October 7, 1979

AUGUST RETAIL SALES OF FARM EQUIPMENT were up in most categories, according to the flash report of the Farm & Industrial Equipment Institute. Tractor sales were ahead after a decline in July.

Equipment	August 1979	August 1978	Pct. Change	January-August 1979	January-August 1978	Pct. Change
Farm Wheel Tractors						
2-Wheel Tractors						
40-100 hp	3,950	3,878	+1.9	45,981	45,526	+1.0
over 100 hp	3,356	2,941	+14.1	43,273	42,268	+2.4
Total 2-Wheel drive	7,306	6,819	+7.1	89,254	87,794	+1.7
4-Wheel drive	719	522	+37.7	6,933	5,348	+29.6
Total Tractors	8,025	7,341	+9.3	96,187	93,142	+3.3
Combines (S-P)	3,150	3,250	-3.1	14,365	14,434	-0.5
Balers*	2,361	2,254	+4.7	14,576	16,847	-13.5
Forage Harvesters**	1,121	1,022	+9.7	5,506	5,085	+8.3
Mower-Conditioners	2,744	2,395	+14.6	20,126	20,046	+0.4

*Bales under 200 lbs. **Shear-bar type.

WORLD CROP PROSPECTS SUGGEST LARGE U.S. EXPORTS, says U. of Illinois ag economist, D. L. Good. Wheat production outside the U.S. is down 12 per cent (down 25 per cent in the U.S.S.R.). Coarse grain production is down 5 per cent outside the U.S. (down 20 per cent in the U.S.S.R.). The U.S., meanwhile, accounts for 14 per cent of the world wheat crop and 30 per cent of the world's coarse grain output. If current USDA estimates hold up, says Good, the U.S. would account for half the world's wheat exports and 70 per cent of coarse grain exports in the 1979-80 crop year. These estimates are for 1979-80 exports of 1.4 billion bu. of wheat, 2.81 billion bu. of feed grains, 825 million bu. of soybeans and 83 million cwt. of rice. The total increase--to 5.1 billion bu.--would be 16 per cent over the current year.

Key problem in meeting export demand, notes Good, is the capacity of the U.S.'s internal transportation system. The port facilities are probably sufficient, he says, but moving 100 million bu. a week would be difficult in view of tight rail car supplies and the threats of strikes and heavy freezes of the Mississippi and Illinois rivers.

FARM EQUIPMENT THEFT: Hearings are expected to begin sometime this fall on S-1214, legislation introduced earlier by Senators Percy (R.-Ill.) and Biden (D.-Del.) concerning theft of motor vehicles. Section 501 of the bill calls for the Attorney General of the U.S. to file a report with Congress 18 months after the law is enacted dealing with theft of off-highway vehicles in agriculture and con-

(Continued on page 67)

RETAIL SALES OF WHEEL TRACTORS*

(In Units)

	Total Wheel Tractors†				Cumulative for Jan.-June, 1978				Cumulative for Jan.-June, 1979			
	June, 1978		June, 1979		Farm Type				Farm Type			
	Farm	Non-Farm	Farm	Non-Farm	2-Wheel Drive	4-Wheel Drive	Total Farm	Non-Farm	2-Wheel Drive	4-Wheel Drive	Total Farm	Non-Farm
Alabama	264	87	239	65	1,724	38	1,762	475	1,673	27	1,700	358
Arizona	65	63	50	70	419	34	453	323	372	45	417	343
Arkansas	325	95	350	111	2,134	189	2,323	521	2,141	145	2,286	383
California	449	423	459	426	2,168	140	2,308	1,932	2,451	166	2,617	1,997
Colorado	83	53	106	65	502	52	554	398	575	93	668	371
Connecticut	11	27	30	21	101	3	104	153	112	.....	112	149
Delaware	15	8	29	8	100	7	107	42	135	10	145	29
Florida	183	173	249	250	1,092	31	1,123	823	1,117	40	1,157	1,005
Georgia	346	113	336	88	2,510	31	2,541	489	2,377	25	2,402	495
Idaho	98	26	92	18	607	65	672	151	569	83	652	104
Illinois	617	200	543	274	4,525	404	4,929	1,062	4,087	432	4,519	952
Indiana	490	144	416	86	3,003	250	3,253	730	2,566	261	2,827	518
Iowa	480	74	606	68	4,967	235	5,202	292	5,464	342	5,806	257
Kansas	450	39	399	32	1,919	236	2,155	228	2,137	307	2,444	185
Kentucky	534	99	461	120	2,913	58	2,971	559	2,778	55	2,833	453
Louisiana	222	155	268	108	1,437	133	1,570	677	1,424	97	1,521	498
Maine	30	12	23	13	114	.....	114	74	116	1	117	78
Maryland	81	59	82	66	449	14	463	323	485	22	507	284
Massachusetts	11	39	16	40	71	.....	71	236	85	.....	85	182
Michigan	315	138	317	202	1,792	140	1,932	770	1,667	142	1,809	781
Minnesota	441	66	592	96	3,328	271	3,599	326	3,626	521	4,147	421
Mississippi	327	111	326	54	2,065	108	2,173	488	2,055	77	2,132	397
Missouri	550	108	544	105	2,761	137	2,898	594	3,177	146	3,323	520
Montana	131	20	123	16	374	179	553	132	506	260	766	111
Nebraska	360	32	344	32	2,360	135	2,495	147	2,758	179	2,937	139
Nevada	9	12	11	18	49	.....	49	127	78	3	81	110
New Hampshire	20	13	18	14	75	.....	75	85	67	.....	67	68
New Jersey	41	101	37	95	213	5	218	376	196	3	199	386
New Mexico	40	30	40	29	250	13	263	217	264	16	280	157
New York	314	169	332	139	1,482	50	1,532	836	1,441	61	1,502	642
North Carolina	319	117	305	98	2,535	34	2,569	619	2,509	43	2,552	576
North Dakota	286	25	280	27	1,368	444	1,812	154	1,474	722	2,196	133
Ohio	558	261	476	289	3,305	192	3,497	1,113	2,689	207	2,896	989
Oklahoma	452	97	423	104	1,511	105	1,616	469	1,672	184	1,856	386
Oregon	144	60	120	57	704	37	741	290	632	31	663	308
Pennsylvania	281	206	280	152	1,572	19	1,591	1,032	1,358	22	1,380	806
Rhode Island	3	3	1	6	13	.....	13	28	12	.....	12	27
South Carolina	170	87	165	58	1,148	14	1,162	318	1,155	22	1,177	277
South Dakota	232	20	191	18	1,322	125	1,447	113	1,423	192	1,615	114
Tennessee	437	99	383	99	2,762	57	2,819	602	2,504	46	2,550	527
Texas	921	462	1,084	457	4,413	164	4,577	2,423	5,144	250	5,394	2,199
Utah	45	29	57	61	306	8	314	253	343	10	353	244
Vermont	39	8	63	20	185	1	186	34	202	4	206	42
Virginia	233	116	259	64	1,348	9	1,357	559	1,436	6	1,442	420
Washington	164	99	187	102	768	85	853	510	873	106	979	494
West Virginia	69	37	79	23	315	.....	315	195	320	.....	320	129
Wisconsin	435	92	630	89	3,046	78	3,124	439	3,528	126	3,654	442
Wyoming	30	21	33	26	196	9	205	106	237	16	253	133
Alaska	6	4	5	5	13	.....	13	27	8	.....	8	23
Hawaii	5	6	6	8	30	3	33	35	33	.....	33	52
U.S. Government	7	37	24	14	32	3	35	503	49	.....	49	449
Miscellaneous‡	42	244	10	230	61	2	63	741	42	3	45	784
TOTAL	**12,180**	**4,819**	**12,499**	**4,736**	**72,457**	**4,347**	**76,804**	**24,150**	**74,142**	**5,549**	**79,691**	**21,928**

Data released August 24, 1979, Farm & Industrial Equipment Institute.

*Figures do not include garden tractors, motor tillers or contractors off-highway types. Report includes units marketed by these firms: Allied Farm Equip. (Leyland, Satoh); Allis-Chalmers; Belarus; J I Case; Deere; Deutz; Ford; Hy-Dynamic; International Harvester; JCB Excavators; K-D Mfg.; Long; Massey-Ferguson; Pettibone; R. M. Wade (Satoh); Steiger; Versatile; White; and Woods & Copeland.

†The monthly sales are those reported for that month only. The cumulative totals are subject to revisions reflecting updating in the basic sales data.

‡Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

Farmers talk tractor reliability, maintenance

Survey by Professional Farmers of America reveals some major concerns about the reliability of over-100-hp tractors. Respondents also reported critical big tractor maintenance and accessibility problems.

PFA Members Rate Big Tractor Reliability

PFA member/farmers were asked to rate several different aspects of their big tractors on a scale of excellent, good, fair, or poor. This table reflects their opinions (by manufacturer) on mechanical reliability.

This survey was taken in early 1978. And because the John Deere 40 Series tractors had only been on the market for a short time (since late 1977), their representation in this particular survey is quite low. Deere units dominated the earlier PFA survey of big tractors.

By Frank Buckingham

■CERTAIN MECHANICAL troubles are common to all tractor lines. But a recent survey by the Professional Farmers of America (PFA) has found that tractor reliability, accessibility and maintenance are often costly concerns.

The PFA survey was conducted in early 1978 and involved only those farmer/members operating current model tractors with more than 100 horsepower. Responses were compiled on 583 tractors representing 28 different models and 10 manufacturers. There were 431 two-wheel-drive tractors reported and 152 four-wheel-drive tractors.

This was the second PFA big tractor survey. And like the first—conducted in late 1975—owners were simply asked to rate their own tractors without any standard or comparison to other models.

PFA members were not asked, and few farmers responding to the survey volunteered, what repair costs they had faced. A number did indicate that they had had serious tractor breakdowns, often accompanied by long delays in getting the units repaired.

Some of these problems were corrected under warranty. And in some cases dealers rented or loaned replacement tractors while repairs were being made. The owners, however, still bore most of the repair cost.

Let's talk dependability

Specific definitions for such terms as reliability and durability can differ widely. So, when discussing tractor breakdowns and failures here, we'll use the term "dependability." In other words, is the tractor ready to work when the owner is ready to use it?

A few owners said their tractors were very dependable: *They could depend on them to break down every time they needed them.* Other owners, of course, were quite pleased with the dependability of their tractors.

Comments made by the owners of one tractor model—with almost 30 units reported—were typical of those expressed throughout the survey.

Several owners of this model noted, "No breakdowns," and "Very reliable." And others said, "Tractor composed of time-proven components." "Minor problems—nothing serious."

But still other owners of that model weren't so lucky. "Bearing in transmission out in 300 hours." "Transmission locked in gear six times." "Safety switches caused starting problems." "Alternator drive pulley came loose, ruined alternator shaft and belts," and "Split twice for transmission work—poor factory assembly."

Expensive downtime

Tractor dependability becomes extremely important in the spring and fall for most users. Delays during critical planting and harvesting periods can cost farmers hundreds of dollars each day in lost income, plus the expense and inconvenience of getting equipment operable again.

The cost of a breakdown to the tractor owner may easily amount to several times the out-of-pocket expense of restoring the tractor to working condition.

In the PFA followup survey, three owners reported average downtime delays of three and one-half days each. Two owners said it took them two weeks to get tractor repairs made, and another reported that his new tractor was in the shop three of the first five weeks he owned the machine.

Search for scapegoats

If one is to believe the comments of farmers regarding defective and improperly assembled new tractors, there must be a large number of units leaving the factory in deplorable condition. But rightly or wrongly, many farmers and a few dealers tend to blame "poor factory assembly" or "poor workmanship" for as many mechanical problems as possible.

When failures are definitely pinpointed as being due to improper assembly or similar factors, many company people tend to blame disinterested employees who are sim-

Mechanical Reliability	Allis-Chalmers	J I Case	John Deere	Deutz	Ford	International Harvester	Massey-Ferguson	Steiger	Versatile	White
Engine	E-111 G-30 F-1	E-19 G-5	E-5	E-15 G-1	E-9 G-3	E-197 G-42 F-2 P-2	E-23 G-8	E-31 G-5 P-1	E-33 G-4	E-25 G-2 F-1
Transmission, Drive Train	E-72 G-49 F-13 P-8	E-13 G-10 P-1	E-3 G-2	E-9 G-7	E-8 G-3 F-1	E-127 G-99 F-14 P-3	E-8 G-14 F-5 P-2	E-24 G-9 F-4	E-30 G-6 F-1	E-19 G-4 F-4 P-1
Hydraulics	E-57 G-58 F-17 P-9	E-8 G-16	E-4 G-1	G-6 F-8 P-2	E-7 G-4 F-1	E-101 G-111 F-26 P-5	E-4 G-14 F-7 P-4	E-12 G-13 F-7 P-4	E-15 G-14 F-8	E-16 G-10 F-2
General Reliability	E-64 G-55 F-14 P-1	E-14 G-8 P-1	E-5	E-6 G-8 F-2	E-9 G-3	E-124 G-103 F-9 P-3	E-9 G-17 F-2	E-15 G-18 F-2 P-1	E-29 G-8	E-18 G-8 F-2

ply "putting in their time and drawing wages."

People on the assembly line insist, however, that they are merely following orders to get a certain quota of goods out the door every shift. They say it's impossible to devote the proper amount of care and attention to each individual item.

If the blame can't be placed anywhere else, tractor drivers are eventually accused of failing to care for the equipment and for negligent operation.

One or more of these factors may actually prevail. But finding a scapegoat was probably not much consolation for the famer who reported, "Engine oil pump relief valve fell apart at 180 hours—took two weeks to repair, plus new crankshaft and bearings—problem was workmanship not engineering."

Another owner complained, "Poor oil pressure when delivered, took three months to find hole in block, then used old sleeves, pistons and crankshaft in new block."

Perhaps a rebuilt unit is mechanically equivalent to a new component, but psychologically, they are inferior to many customers.

One owner reported, "Injector pump failed at 60 hours and company refused to put on new pump, used a rebuilt one instead and said I can't do anything about it. But I can, my next tractor will be a different color after using this line 21 years."

(More...)

Correction: Deutz Models Were Introduced in 1971, 1972

To the editor:

I have read with interest "How Pro Farmers Evaluate Big Tractors: New Model Update, 1978" and I also read the excerpts of the report in I&T with Frank Buckingham's commentary. The report makes interesting reading, but unfortunately the two Deutz models listed are somewhat misrepresented—inadvertently, I am sure.

The report indicates, and Buckingham clearly states, that the 28 models included were introduced between 1975 and 1978. For the record, the D 10006 and the D 13006 were introduced in the U.S. in 1971 and 1972, respectively. They are now no longer produced. The reader who is unaware of this may therefore draw a direct comparison between the newer models of U.S. competitors and Deutz models of older vintage and cabs which are not up to date. Buckingham's conclusion (I&T Aug. 21, page 20)—"Deutz, which was not represented in the first big tractor survey, had the lowest cab rating"—may be consistent with the report but is definitely misleading the reader.

We at Deutz have the highest regard for the quality and integrity of *Implement & Tractor.* We also believe in the good intentions of the Professional Farmers of America (which conducted the survey).

F. J. Kaplan, marketing
vice-president
Deutz Corp.
Atlanta, Ga.

(Author Buckingham agrees that it should have been pointed out that the Deutz models were included by PFA in its 1978 report because the number of Deutz models had been too few to include in the 1975 report. Since the 1978 report was issued, Deutz has introduced its DX line of high-horsepower tractors, succeeding the 10006 and 13006 models.—The editors.)

Problem areas

Transmission and drive train related problems outnumbered all other problems reported in the PFA followup survey. There was a transmission, or drive train failure, malfunction, or operational problem reported for every three tractors in the survey.

There was also a hitch or hydraulic problem reported for one in every four tractors, and one in 10 had electrical or control system complaints. Numerous hydraulic pump and seal failures were reported and several hitches were said to be too weak for the power of the tractor. Hitch weaknesses included both physical hitch components and the lifting capacity of the hydraulic system.

Premature engine failures, faulty or maladjusted injector pumps, leaking fuel lines and fittings, and other engine and fuel system problems were also noted for one in 10 tractors.

Cab air conditioning and heating systems were singled out for numerous complaints. One model—with 16 tractors reported—had 10 complaints concerning the cab air conditioning and/or heating system.

The perennial problem of oil leaks was noted for one tractor in 28 in the survey. And this did not include those mentions of specific hydraulic or engine oil leaks that were categorized as either hydraulic or engine problems. Some owners indicated that seals had leaked since the tractor was new, and leaky seals of one sort or another had reportedly caused numerous component failures.

On the positive side, favorable comments were offered for one tractor in three regarding general dependability (reliability), or the reliability of specific components such as the engine, hydraulic system, transmission and drive train. Different owners of one model said, "Built too good to break down," and "First tractor that had the bugs out when we bought it."

Owner ratings were reported as excellent, good, fair and poor, and each was assigned values of 4, 3, 2, and 1, respectively. The totals were converted to a percentage of the possible score had all ratings been excellent.

Reliability ratings by manufacturer ranged from 78.9 to 96.2, a spread of 17.3 points, compared with a spread of only 4.5 points between tractor lines in the first PFA tractor survey. The average reliability rating for all tractors in the follow-up survey was 86.7, down slightly from the 87.2 average in the earlier survey.

Maintenance, accessibility

The accessibility rating for repairs and maintenance of a particular tractor may depend on who does the rating, or what tractor model is used for comparison.

Pros and cons were found for the same feature on many models. For example, one owner commented, "Good fueling—no spills on tractor," but another owner of that model griped, "Fuel tank hard to

Farm equipment manufacturers have reliability troubles, too

Farmers aren't the only ones plagued by equipment and/or component reliability problems. A survey taken by the National Fluid Power Assn. (NFPA) last winter found that some farm equipment manufacturers have similar problems with their hydraulic component suppliers.

Hydraulic component users, makers of both self-propelled and non-self-propelled equipment, were asked to evaluate and rate questions about product features. They were also asked to compare the fluid power industry's performance and operation with that of non-hydraulic equipment manufacturers.

Comments made by surveyed manufacturers focused on component reliability, technical assistance, follow-up assistance, product delivery, component quality, and adaptability of components to product systems.

Products covered were: pumps, valves, cylinders, and lines, hoses and fittings.

One manufacturer said, "Poor ratings are true for all hydraulic component suppliers. Someone needs to shake that industry up and bring them into the 20th Century."

Another noted, "There is a definite need for more reliability in the farm machinery industry."

"Service warranties seem like a sideline part of the business for some vendors," wrote another manufacturer. "Parts support is not covered early enough to insure prompt repair of units when a product reaches the field."

When comparing hydraulic cylinder suppliers with non-hydraulic suppliers for product delivery, almost half of the non-self-propelled equipment manufacturers who responded rated them worse than the non-hydraulic suppliers. Valve suppliers faired only slightly better.

Manufacturers of lines, hoses, fittings and pumps, however, were given generally good ratings for product delivery.

One manufacturer wrote, "Hydraulic cylinders are of excellent quality if purchased from reputable sources. However, some sources have very low quality. Lead time is several months ahead of production scheduling."

Not all companies, of course, were critical of their hydraulic component suppliers. Some were even complimentary. But despite their opinions, their answers indicate that farmers aren't the only ones with equipment supplier problems.

get full."

Engineers report that, on some tractors, access to air filters has been deliberately made more difficult because a few owners were found to be over-servicing dry-type air cleaners and literally beating them to death, resulting in filter damage, dust leaks and subsequent premature engine failures.

On the other hand, there has been little justification offered (and even less accepted by farmers) for the unsightly mess created on the sides of many tractors each time oil is added or an engine or hydraulic filter is removed.

Equally confusing and disturbing to some owners is the placement of the engine oil dipstick and filler plug on opposite sides of the tractor, requiring several additional, and seemingly unnecessary, time-wasting steps to check and add oil.

Swing-out batteries were praised by some tractor owners for their ease of inspection and service. However, an engineer defended one model (criticized for extremely difficult battery access) by stating that service-free batteries were provided. That's fine, but such designs force replacement with the same type of battery, or assure frequent replacement of less costly non-serviced conventional batteries.

Cab filter location also remains a point of controversy among some owners. Removing the filter from inside the cab makes it easy to get at and service quickly, but it also means a lot of dirt knocked off the filter and the housing each time it's removed. That means extra cab cleaning.

There was also common sentiment that grease fittings on most four-wheel drives could, and should, be made easier to reach. Location of some fittings requires getting under the tractor daily, which is a distasteful task. Some filters were also said to be very difficult to reach, remove and replace.

The sentiment was also expressed that tractors have become over-sophisticated. One owner, who expressed this feeling more strongly than most, remarked, "Good basic design but too much little-used Mickey Mouse junk hung on to make it look good in sales brochure—keep them simple, why do you think plain, clumsy imports sell as fast as they are produced?"

Overall maintenance ratings (by tractor line) ranged from a high of 92.9 to a low of 78.6. The industry average was 85.4. That's the same industry average for all tractors as in the original PFA survey. The high and low ratings in that first survey were 92.3 and 80.

The overall user rating for ease of maintenance for all four-wheel-drive tractors was 83.1, compared with 86.2 for two-wheel drives. While many aspects of four-wheel-drive tractors are often described as simpler and less sophisticated than two-wheel drives, ease of maintenance apparently has not yet reached that level for the industry as a whole. □

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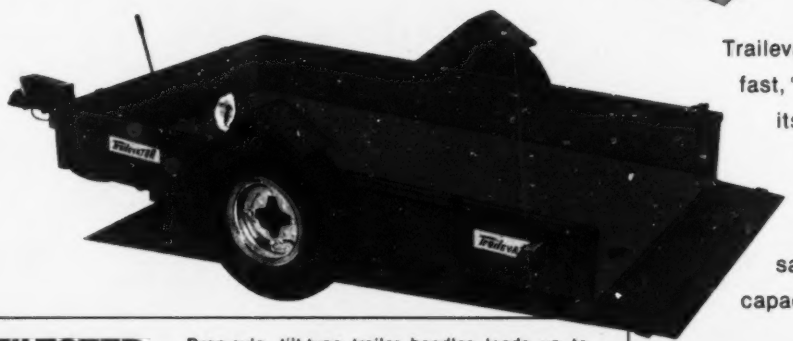

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RETAIL SALES OF SELECTED FARM EQUIPMENT—Jan.-June, 1978 and 1979 (1)

(In Units)

	Combines Self-Propelled		Corn Heads		Hay Balers (2)		Windrowers Self-Propelled Power Units		Windrowers Self-Propelled Total Heads		Grinder-Mixers		Shear-Bar Forage Harvesters (3)	
	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979
Alabama	94	91	20	23	221	92	1	.....	1	.....	98	137	20	20
Arizona	29	16	3	.....	17	14	36	30	39	33	6	4	4	6
Arkansas	205	176	1	1	322	169	1	2	1	1	39	39	6	8
California	81	79	13	16	125	68	182	133	198	150	3	9	25	29
Colorado	63	101	15	22	162	109	112	117	115	124	24	47	30	24
Connecticut	.....	.....	.....	.....	29	17	.....	.....	.....	.....	1	2	6	10
Delaware	8	9	3	6	20	5	3	.....	3	.....	2	7	5	3
Florida	38	25	19	19	53	40	.....	1	.....	2	22	41	11	5
Georgia	204	188	124	102	205	95	3	1	3	1	223	323	41	32
Idaho	67	78	3	3	173	122	118	135	121	136	11	24	22	13
Illinois	831	891	716	665	228	152	14	8	14	8	402	448	98	124
Indiana	516	552	469	441	248	174	3	5	3	5	305	412	63	81
Iowa	602	853	548	537	254	172	142	136	142	138	908	1,462	258	255
Kansas	656	779	57	62	248	246	212	233	219	238	153	228	63	85
Kentucky	106	157	88	77	411	202	3	2	3	2	187	226	60	46
Louisiana	101	112	1	.....	93	56	.....	.....	.....	.....	10	12	8	4
Maine	1	1	.....	.....	20	21	.....	.....	.....	.....	.....	1	12	18
Maryland	29	28	30	17	77	50	6	8	7	7	27	29	24	24
Massachusetts	.....	.....	.....	.....	21	20	1	.....	1	.....	3	1	3	6
Michigan	145	150	118	94	250	161	37	34	34	37	151	170	85	158
Minnesota	473	512	272	330	559	358	379	307	389	315	345	649	299	322
Mississippi	137	157	3	3	127	78	.....	.....	.....	.....	40	35	17	17
Missouri	282	319	124	136	480	319	54	58	56	57	266	452	45	73
Montana	95	84	.....	2	128	165	214	161	219	162	30	52	8	11
Nebraska	372	383	227	188	117	112	269	300	275	300	234	424	102	105
Nevada	1	.....	.....	.....	22	15	33	31	36	34	1	1	2	2
New Hampshire	.....	.....	.....	.....	14	12	1	.....	1	.....	.....	2	6	7
New Jersey	15	12	8	5	34	32	1	.....	1	.....	7	11	8	5
New Mexico	8	8	5	.....	78	62	57	48	56	48	7	15	3	2
New York	39	30	49	41	259	212	25	33	27	33	113	74	186	202
North Carolina	77	141	71	74	316	135	2	3	2	3	117	159	30	26
North Dakota	267	358	5	7	38	23	354	316	361	323	60	127	25	20
Ohio	375	468	305	321	435	270	6	7	6	7	308	362	78	90
Oklahoma	269	318	2	2	431	451	98	104	100	108	65	105	17	23
Oregon	91	55	1	.....	172	145	160	109	171	109	11	25	42	34
Pennsylvania	41	68	56	50	480	371	42	40	42	41	184	222	148	184
Rhode Island	.....	.....	.....	.....	2	2	.....	.....	.....	.....	.....	1	.....	.....
South Carolina	73	90	27	33	118	53	.....	.....	.....	.....	52	73	14	12
South Dakota	181	145	66	67	90	43	387	396	402	419	167	260	83	78
Tennessee	106	157	35	34	534	317	2	.....	2	.....	122	174	65	62
Texas	315	367	47	64	679	612	60	59	65	66	102	156	18	33
Utah	12	6	.....	.....	129	95	64	59	64	59	25	55	29	19
Vermont	.....	.....	1	.....	42	38	.....	.....	.....	.....	1	2	28	38
Virginia	49	63	36	50	329	235	5	4	5	4	83	104	65	49
Washington	81	128	3	10	160	101	105	103	104	106	14	15	47	43
West Virginia	2	1	1	2	185	118	.....	.....	.....	.....	17	17	15	8
Wisconsin	84	70	113	83	858	706	163	185	163	187	291	432	648	751
Wyoming	13	16	3	2	50	45	58	60	61	61	13	18	4	7
Alaska	.....	.....	.....	.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....
Hawaii	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
U.S. Government	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Miscellaneous (4)	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	.....
TOTAL	**7,235**	**8,243**	**3,688**	**3,589**	**10,045**	**7,112**	**3,413**	**3,228**	**3,512**	**3,324**	**5,251**	**7,659**	**2,876**	**3,174**

Data released August 24, 1979, Farm & Industrial Equipment Institute.

(1) Includes revisions for prior months.
(2) For making bales of under 200 lbs.
(3) Pull-type, mounted, self-propelled.
(4) Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

Mower Conditioners All Types 1978	1979	Manure Spreaders Conveyor-Type 1978	1979	
160	137	16	11	Alabama
2	4	5	6	Arizona
340	348	69	80	Arkansas
34	33	37	49	California
54	61	30	53	Colorado
32	38	54	58	Connecticut
16	9	43	47	Delaware
45	39	13	16	Florida
229	153	22	32	Georgia
68	45	85	77	Idaho
490	453	816	716	Illinois
390	416	543	503	Indiana
898	856	1,642	1,785	Iowa
449	566	141	185	Kansas
786	759	241	236	Kentucky
60	60	11	17	Louisiana
44	54	83	89	Maine
82	98	184	145	Maryland
29	38	47	49	Massachusetts
416	359	543	555	Michigan
675	786	1,107	1,286	Minnesota
96	84	18	20	Mississippi
1,054	1,147	278	340	Missouri
62	45	43	35	Montana
292	360	315	413	Nebraska
1	4	2	2	Nevada
33	19	38	37	New Hampshire
45	37	40	39	New Jersey
13	8	2	3	New Mexico
416	504	1,061	941	New York
287	246	131	110	North Carolina
61	73	120	71	North Dakota
746	654	720	722	Ohio
463	574	19	24	Oklahoma
154	110	61	74	Oregon
591	598	964	926	Pennsylvania
5	3	2	1	Rhode Island
115	89	21	24	South Carolina
75	88	190	239	South Dakota
595	606	117	135	Tennessee
728	833	81	91	Texas
80	78	102	66	Utah
85	96	184	180	Vermont
411	474	175	159	Virginia
105	92	71	98	Washington
117	125	66	68	West Virginia
1,454	1,486	1,818	2,047	Wisconsin
110	16	39	37	Wyoming
.....	.....	.....	.....	Alaska
.....	1	.....	1	Hawaii
.....	.....	.....	.....	U.S. Government
.....	.....	1	.....	Miscellaneous
13,493	**13,762**	**12,411**	**12,898**	**TOTAL**

NOW! Any Size Clamp From a Kit

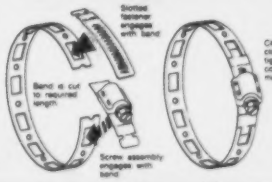
MAC
100% stainless for hose clamps, plastic pipe, irrigation pipe, duct & pipe insulation — strapping and hangers.
Mak Aclamp
Stock #4000 makes:
3 clamps up to 12" diameter
2 clamps up to 17½" diameter
1 clamp up to 33¾" diameter

MakAclamp®, a versatile multi-functional clamp kit enables you to make the exact size clamp for the **"ODD BALL"** size/requirement, using only a screwdriver and metal snips for easy construction. Sizes range from the tool box kit #4000 (8.5 ft. of band with 3 tightening assemblies) up to the larger shop kits #4001 (100 ft. of band with 25 tightening assemblies), #4002 (50 ft. of band with 10 tightening assemblies) and #4004 (box of 10 tightening assemblies). Band splices are included with each kit to join/extend short band segments. All parts are 100% stainless steel including the slotted hex-head screw for lasting performance.

A must for maintenance depts., heavy equipment, farm, auto repair, workshop, marine applications and off-road RV vehicles

3 EASY STEPS TO MAKE ANY SIZE CLAMPS

1. Cut required length of band from roll with snips, cold chisel, or aviation type shears. **2.** Insert slotted fastener end in perforated band at one end and screw housing assembly at the other end. **3.** Engage slots with worm-drive take-up and tighten clamp with screwdriver, wrench, or socket.


Slotted fastener engages with band
Band is cut to required length
Clamp is closed & tightened in conventional manner
Screw assembly engages with band

SPECIAL INTRODUCTORY OFFER

Allow 4-6 weeks delivery

Please send me the following Mak-A-Clamp Kit(s) at the special introductory price.

BREEZE CORPS., INC.
Breeze Clamp Company
103 Aero-Seal Drive
Saltsburg, Pa. 15681
(412) 639-3571 Telex 86-6294

MINIATURES MAK-A-CLAMP POWER-SEAL AERO-SEAL HI-TORQUE

	Each	Postage/ Handling
☐ **#4000** *(8.5 ft. of band with 3 tightening assemblies)*	$ 3.98	+ 1.00
☐ **#4001** *(100 ft. of band with 25 tightening assemblies)*	31.95	+ 3.00
☐ **#4002** *(50 ft. of band with 10 tightening assemblies)*	14.95	+ 2.00
☐ **#4004** *(Box of 10 tightening assemblies)*	6.59	+ 1.00

Total Cost $ _____

Check or money order including postage and handling charges must be sent with order. Open terms extended only on minimum orders of $50.00 or more to credit approved firms, include bank and references. Shipped F.O.B. Saltsburg, Pa.

Name _____ Address _____

City _____ State _____ Zip _____

BA2315-1

Circle (41) on Reply Card

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

BILL ENLOW TRACTOR SALES
Tulsa, Oklahoma
(August 11, 1979)

ALLIS-CHALMERS TRACTORS

B, 1948 (Fair)	450
D17, diesel, 1959 (Good)	1650
D17, 1961 (Rough)	1010
D17 diesel, 1962 (Good)	2750
D19, 1960 (Rough)	1300
I400, (Good)	2500
7050, cab, 1975 (Good)	9000

CASE TRACTORS

530 diesel, ldr., 1961 (Good)	3500
770, 1970 (Good)	4000
900 diesel, 1957 (Fair)	1000*
900 LP, 1958 (Fair)	980*
930 diesel, 1962 (Fair)	2900

FERGUSON TRACTORS

20, 1949 (Good)	1075
30, 1951 (Rough)	850
30, 1951 (Good)	1300
30, 1951 (Rough)	800*
30, 1952 (Rough)	500
30, 1952 (Good)	1075*
30, 1952 (Good)	1375

FORD TRACTORS

9N, 1943 (Fair)	800*
9N, 1944 (Fair)	750
9N, 1944 (Good)	1100
9N, 1944 (Good)	950
9N, 1945 (Fair)	700
9N, 1945 (Good)	1475
9N, 1946 (Good)	1275
9N, 1946 (Good)	1300
8N, 1947 (Good)	1400*
8N, 1947 (Good)	1250*
8N, 1948 (Good)	1425
8N, 1948 (Good)	1450
8N, 1949 (Fair)	1025
8N, 1950 (Good)	1800
8N, 1951 (Good)	1550*
8N, 1952 (Fair)	1200
8N, 1952 (Fair)	1150
8N, 1952 (Good)	1350
8N, 1952 (Good)	1700
8N, ldr., 1952 (Good)	1650*
8N, 1952 (Good)	1650
8N, 1952 (Good)	1525
NAA, 1953 (Rough)	1075*
600, 1955 (Good)	1750*
800, ldr., 1955 (Good)	2000
801, 1958 (Good)	2550
801, 1958 (Good)	2325
801, 1959 (Good)	2800
900, 1959 (Fair)	1150*
Mjr., diesel, 1956 (Fair)	1000
2000, 1962 (Good)	1950
2000, 1963 (Good)	2500
2000, 1968 (Good)	3000*
2600, 1979 (New)	6000*
3000 diesel, 1966 (Fair)	2750*
3000 diesel, 1967 (Good)	3450
3000 diesel, 1969 (Good)	3450
4000 diesel, 1968 (Good)	4850

INTERNATIONAL HARVESTER TRACTORS

Super A, 1953 (Good)	1500
Cub, mo., 1948 (Good)	1250*
Cub, mo., 1950 (Fair)	1050*
Cub, mo., 1956 (Good)	1300
154 Loboy, 1968 (Good)	1850
154 Loboy, 1969 (Good)	1800
B 275 diesel, (Good)	1700
B 414, (Fair)	1200
444 diesel, 1968 (Good)	2600
454, (Good)	2900
460, 1960 (Good)	1450
460, 1961 (Fair)	1150
504, 1965 (Fair)	1125
664, 1972 (Good)	4250*
806 diesel, 1966 (Good)	4150

JOHN DEERE TRACTORS

MT, 1948 (Good)	450
60, 1955 (Good)	1250
2010, 1961 (Good)	2000
2010 diesel, 1962 (Good)	2400
2010 diesel, 1962 (Good)	2250
2010, 1963 (Fair)	1750*
2020 diesel, 1967 (Good)	4100*

KUBOTA TRACTOR

175 diesel, (Good)	2150*

LONG TRACTORS

445 diesel, (Fair)	2550
384 diesel, (Fair)	2250

MASSEY-HARRIS TRACTOR

44, bld., 1950 (Fair)	300

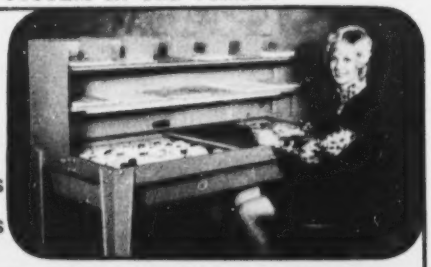
MASSEY-FERGUSON TRACTORS

35, 1958 (Good)	2000
35, 1958 (Good)	2150
35, ldr., 1959 (Good)	2550
35, 1958 (Fair)	1550*
35, ldr., 1960 (Fair)	1925
35, 1961 (Good)	2200
65, 1959 (Good)	1900*
65, 1961 (Good)	2150
65 diesel, 1962 (Good)	2300
65 diesel, 1963 (Good)	2400*
65 diesel, 1963 (Good)	2200*
65, 1963 (Fair)	1750

E-Z-WAY THE MOST TRIED, PROVEN AND ACCEPTED INVENTORY CONTROL SYSTEM IN USE TODAY!

METAL TABLE SYSTEMS

9000 RECORDS $496.50*
15,000 RECORDS $700.50*
18,000 RECORDS $798.38*



Three systems—9000 - 15,000 - 18,000 Records. COMPARE THE PRICE . . . low initial cost, easy to set up! COMPARE THE CAPABILITY . . . simple, efficient day-to-day stock control! COMPARE WITH ANY OTHER METHOD . . . any way you look at it you're going to save TIME, MONEY and INCREASE PROFITS.

ROLL TOP SYSTEMS

RJC- 40
4000 RECORDS
$193.61

Designed for those applications requiring 500 to 4000 Card Records. Beautifully styled wood grain cabinets with self-storing roll top are complete units, ready to use, with Records Cards, Back-Order Cards, Metal Tab Dividers and Colored Sub-Dividers.

SIMPLICITY PLUS EFFICIENCY!

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SALES AND DISTRIBUTION CENTERS
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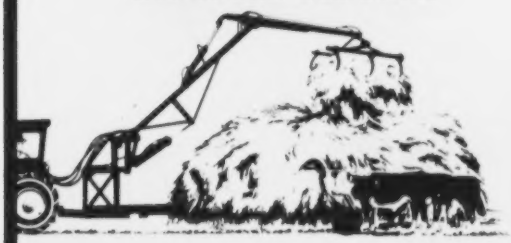
Circle (64) on Reply Card

HOW TO GET A TIGHT GRIP ON LOOSE HAY...



The Baker Hydra-Fork . . . it feeds out a 6-ton stack in less than an hour. Or feeds a tub grinder. Or a baler. And it's as handy in summer for stacking as it is in winter for feeding. Here's why:

- ☐ Up to 20 foot reach, 18 foot lift, 170 degree swing radius
- ☐ Choice of tractor hydraulic power or self-contained 10 HP engine
- ☐ Mounts on stack mover, tractor or truck
- ☐ Less wind loss than a flail-type feeder
- ☐ Foreign objects in hay can't hurt the Hydra-Fork

The Baker Hydra-Fork. It can cut your hay handling costs by 50% and more. Call or write immediately for information.

BAKER

BAKER HYDRA-FORK CO.
Neligh, Nebraska 68756 ☐ 402-887-4147

Circle (65) on Reply Card

65 diesel, 1964 (Good) 2150
65, 1964 (Rough) 1575
Super 90 diesel, 1963 (Good) ...2775
130 diesel, 1968 (Good) 2100
135, 1965 (Fair).....2600
135, 1966 (Good) 3000
135 diesel, 1966 (Good) 3500
135 diesel, 1969 (Good) 3650
135 diesel, 1970 (Good) 3800*
135 diesel, 1971 (Good) 3750
150, 1967 (Fair).....2675
165 diesel, 1966 (Fair).....2780
165 diesel, 1970 (Good) 4000*
165 diesel, 1971 (Good) 4025
165 diesel, 1974 (Excellent) 5400
175 diesel, 1972 (Good) 4425
230 diesel, 1979 (New) 6100
230 diesel, 1979 (New) 6175
245 diesel, 1979 (New) 6975
245 diesel, 1979 (New) 6800*
245 diesel, 1977 (Good) 5100
202, ldr., 1966 (Fair) 2150*

MINNEAPOLIS-MOLINE TRACTORS
U-302, 1966 (Good) 1850*
602, 1963 (Good) 2000*

NUFIELD TRACTORS
3/45 diesel, (Good) 1300
3/45 diesel, (Good) 1350

OLIVER TRACTORS
550 diesel, 1965 (Good) 1890*
55, ldr., 1965 (Fair) 1200
1855 diesel, 1971 (Good) 5600

WHITE TRACTOR
4-150 diesel, 4-W-D, 1973 (Good) 8200

NOTES
Prices reported are for individual sales at wholesale on "as is," "cash and carry" basis.
Prices reported are NOT averages.

Condition classifications: EXCELLENT means—Engine: in perfect condition, 400 to 600 hours of use; Rubber: 80% tread remaining, no breaks or cracks; Paint: original and bright; General Appearance: excellent.

GOOD means—Engine: good running condition; Rubber: 70% tread remaining, no breaks or cracks; Paint: original paint or a good repaint job; General Appearance: good over-all.

FAIR means—Engine: possibly in need of a minor overhaul to restore; Rubber: 60% tread remaining, some cracking evident in side walls; Paint: only fair, weathered and some rust apparent; General Appearance: worn, some dents, minor parts such as gage covers missing or broken.

ROUGH means—Engine: obviously in need of a major overhaul; Rubber: smooth; Paint: scarred, weathered, rusty, needs painting urgently; General Appearance: dents, ruptures, broken parts, loose wires, some components such as lights broken, missing or inoperative.

DEMONSTRATOR means—used for demonstrating only and in practically new condition.

Don't sell too low...

and don't pay too much...

stay up-to-date on used equipment values with I&T

Check high or low pressure systems...only 50 psi drop at full flow.

HEDLAND FLOW METER TEST KITS

Compact, low-cost testers check hydraulic flow and/or pressure from 0 to 3,000 psi. Detect hydraulic pump leakage under load, verify flow and pressure control settings, monitor overall performance of system, etc. Direct reading—no electrical connections. Four sizes with ¼", ½", ¾" and 1¼" ports...flow scales from 0.05 to 150 GPM. Flow meters available separately for permanent installation or assembling your own test kit.

Send for details.

20-347

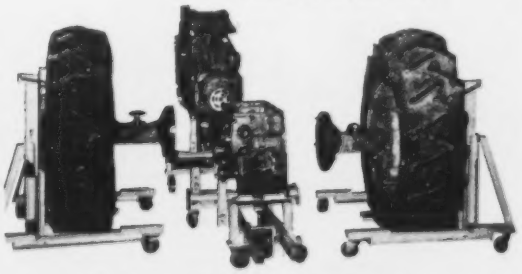
HEDLAND PRODUCTS
DIV. OF RACINE FEDERATED INC. · 2200 SOUTH ST.
RACINE, WISCONSIN, 53404 · TEL. 414-639-6770

Circle (68) on Reply Card

COFER

Heavy Duty Tractor Splitting Stands and Tire Carts

PATENTS APPLIED FOR



- 60 Day satisfaction guarantee
- 1 set of stands fits all tractors (frame or frameless)
- One man installation in less than 5 minutes
- Heavy 6" castors for easy roll

LIKE ADDING A GOOD MAN TO YOUR SHOP

Cofer Sales & Manufacturing Co.
1011 Central Dodge City, KS 67801 (316) 227-6170

Circle (67) on Reply Card

NOTE

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HAVE BEEN FILMED

Cover 1, p 4,
p. 12, 14, 34,
p. 26 - 28, 32,
p. 35 - 37.